

CLAIMS

What is claimed is:

- Spec 1*
1. A semiconductor power module, comprising:
 - a lead frame having a first portion at a first level, a second portion surrounding the first portion at a second level, and a plurality of terminals connected to the second portion;
 - a power circuit mounted on a first surface of the first portion;
 - an insulator having an electrically insulating property and thermal conductivity, wherein the insulator is adjacent to a second surface of the first portion; and
 - a sealer having an electrically insulating property that covers the power circuit.
 2. The semiconductor power module of claim 1, wherein the first portion of the lead frame is centrally positioned within the lead frame.
 3. The semiconductor power module of claim 1, wherein the power circuit includes a power semiconductor element.
 4. The semiconductor power module of claim 1, wherein the first surface of the first portion is a top surface and wherein the second surface of the first portion is a bottom surface.
 5. The semiconductor power module of claim 1, further comprising a control circuit that drives the power circuit.

6. The semiconductor power module of claim 1, further comprising a heat detection circuit that detects the heat produced by the power circuit.

7. The semiconductor power module of claim 1, wherein the insulator directly contacts the second surface of the lead frame.

8. The semiconductor power module of claim 1, wherein the insulator is adhered to at least one of the lead frame and the sealer with an adhesive.

9. The semiconductor power module of claim 8, wherein the adhesive contains a filler that includes at least one compound selected from the group consisting of Al_2O_3 , AlN and BeO.

10. The semiconductor power module of claim 1, wherein the insulator and the sealer each have grooves or rings and wherein the insulator and the sealer are connected to each other by means of the grooves or the rings.

11. The semiconductor power module of claim 1, wherein the insulator is sheet-shaped and comprises at least one compound selected from the group consisting of Al_2O_3 , AlN, and BeO.

12 A method of manufacturing a semiconductor power module having a lead frame with a first portion at a first level and a second portion surrounding the first portion at a second level, the method comprising the steps of:

die-bonding a power circuit onto a first surface of the first portion of the lead frame;

wire bonding electrodes of the power circuit to the lead frame;

molding the lead frame and the power circuit with a sealer; and

adhering an insulator with thermal conductivity and an electrically insulating property onto a second surface of the first portion.

13. The method of claim 12, further comprising the step of die-bonding a heat detection circuit onto the lead frame.

14. The method of claim 12, wherein the step of adhering the insulator onto the second surface of the first portion includes the step of adhering the insulator directly to the first portion of the lead frame.

15. The method of claim 12, comprising the step of adhering the insulator onto the second surface of the first portion with an adhesive.

16. The method of claim 15, wherein the adhesive contains at least one compound selected from the group consisting of Al_2O_3 , AlN and BeO.

17. The method of claim 12, wherein the insulator and the sealer each have grooves or rings and wherein the insulator and the sealer are connected to each other by means of the grooves or the rings.

18. The method of claim 12, wherein the insulator is sheet-shaped and comprises at least one compound selected from the group consisting of Al_2O_3 , AlN, and BeO.